

BRYAN (A.)

READ BEFORE THE
DETROIT MEDICAL AND LIBRARY ASSOCIATION
FEBRUARY 6, 1893.

AN INQUIRY INTO THE CAUSES OF THE MORTALITY OF DIPHTHERIA, AND SOME SUGGESTIONS WITH REFERENCE TO THE TREATMENT OF DIPHTHERIA.

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I SPEAK with candor. Therefore permit me to say that, according to my understanding and convictions, I believe that many noble-minded and sincere thinkers in our profession are unwittingly impeding the proper evolution of the treatment of diphtheria by certain grievous and most unfortunate errors, in which they repose a blind and implicit faith. They are doubtless honest, but also dreams are honest, and they are none the less fanciful for that.

I believe that the frightful mortality of diphtheria is due almost altogether to its constitutional treatment as adopted by physicians at large. In the treatment of diphtheria there are deleterious medicinal agents in extensive use. In my opinion the two most destructive of these, and employed blindly as remedies, are alcoholic liquors and corrosive sublimate, given internally. I believe that both of these so-called remedies are in many instances deadly when given in cases of diphtheria. For these death-bearing agents a most strange fascination possesses the minds of a very large number of medical men at the present day. Hardly anything has been known like it since the palmiest days of venesection. If the infatuation progresses, more persons are liable to die under the baleful influence of this ghastly constitutional treatment than succumbed to the murderous management of wounds which preceded the advent of Paré's methods in surgery. In this arraignment I am convinced that I use no extravagant terms. They are indeed not so strong in their expression as the bier and the coffin which appear before our eyes every day; and these latter are phenomena which should arrest the attention of every thoughtful man. According to the formal and systematic reports of authorities to-day, nearly one-third of all the persons affected by diphtheria die of the malady. And, according to the statements of medical journals and standard books, nearly all the cases of diphtheria are submitted to the alcoholic treatment, and to this is often added the treatment by the ingestion of corrosive sublimate.

Let us proceed to examine these deleterious agents lauded as remedies. Should

*In this note it is a matter of extreme regret on my part to be compelled to say that during the preparation of this paper I ascertained that a peculiar circumstance had deprived me of the pleasure of obtaining a record of the ultimate and collected results of my treatment of diphtheria for many years past. For my record I had relied on the books of the Detroit health office. When I came to look into them I found there the name of another physician named Bryan, and whose initials are just the same as mine. Therefore, for the most part I was unable to distinguish the record of my own cases from that of his. However, from all sources, I have identified enough cases to show that the mortality in my own treatment of diphtheria is rather less than ten per cent. The general mortality of diphtheria in this city is a mean of about thirty per cent.

A. B.



I be permitted to advise, I would counsel a physician when he is confronted by a case of diphtheria, to not become excited as in the presence of a fire, but to view the circumstances with equanimity; and above all, to take a deliberate and quiet survey of the nature of the remedies which his imagination proposes; and let him on such an occasion be not too much filled by a deferential reverence for the sanctity of authority; for it is often reverence in medicine that jeopardizes and destroys the life of the patient, and retards a progressive evolution in the art of healing. Some old man with the garb and mien and thought of a recluse, may have imagined that it is a good thing to fill a delicate system with corrosive sublimate, and then to wash the poison out again by means of internal ablutions of whisky. Some fanatic may have had a disordered dream and then adopted it into practice. I have always said, and I say now, beware of the ancients; and notwithstanding them, let the torch of your reason ever cast its beams in front of you. Therefore, let the alert and thoughtful physician, when brought into the presence of diphtheria (or of any other adynamic disease) look up a much neglected book, namely, "TAYLOR on Poisons" (newest edition). Let him read therein what that author says on the subjects of alcohol and of corrosive sublimate as poisons. It is well to do this before having struck the first blow at the patient. The unfortunate one is already stricken by the disease, therefore let the medical attendant forbear until he shall have thought at least twice.

I cannot here adduce all that TAYLOR has said on the subject of alcohol as a poison. Suffice it to abstract, and paraphrase, a few of his conclusions. They are these: "Small quantities of alcohol frequently kill children; and larger quantities often destroy adults. In all the cases there is intense congestion of the brain and lungs. There is usually great damage to the mucous membrane of the stomach; it may be found congested, inflamed, ulcerated. Either with or without death, there may be delirium, coma, paralysis. In acute alcoholic poisoning death may be the sequel of continuous symptoms, or there may be a remission closely followed by a renewal of the symptoms and by a fatal termination. After the acute poisoning, a prostrated and enfeebled condition of the general system may endure for days or for weeks when the dose has not been sufficient to kill, or if so, when death is long delayed. In numerous instances there is granular degeneration of the kidneys." [In the cases of chronic poisoning the list of symptoms is long and painful to contemplate, but their citation is not essential for the purposes of this paper.] "The alcohol that is eliminated escapes through all the emunctories. Every excretory gland exerts itself to rid the economy of the poison." Such knowledge on this subject, and much more, do we get from "TAYLOR on Poisons."

RICHARDSON (than whom there is no higher authority), in his "Ten Lectures on Alcohol" (delivered before the Society of Arts, London), says that alcohol increases the pulse-rate many thousands of times in the twenty-four hours. How exhausting then, must alcohol be in adynamic diseases? It is this powerful—and in adynamia—deleterious, agent that has been brought forward in vaulting and dithyrambic style, as the sovereign balm for those who are in pain, in fear, and in danger of death, on account of diphtheria. Just think about it. Its advocates say just have the patients swallow some corrosive sublimate every two hours, and at the same time give them plenty of liquor to wash it out with.

Now let us examine the subject of corrosive sublimate. Refer to "TAYLOR on

Poisons," and turn to the article "Corrosive Sublimate," in that standard authority. In evidence it will be found there that all forms of mercury (even in few and minute doses, and cautiously given) wherever there is a granular state of the kidneys, with albuminuria, are especially dangerous and destructive. In such cases there are ulceration and gangrene of the throat, destruction of bones, marasmus and death, as frequent occurrences. I am informed upon respectable authority that fully twenty per cent. of all the cases of diphtheria treated in a certain large and well regulated hospital show the symptom of albuminuria. In that hospital they say that "whenever one of our diphtheria patients gets gangrene of the throat he is sure to die." In that same hospital corrosive sublimate and whisky are the "sheet-anchors." Just think about all that. In that hospital they have *two* "sheet-anchors," corrosive sublimate and whisky. They have provided well there, for hardly any ship carries more than one of those steadfast arrangements. But the history of medicine affords an account of other "sheet-anchors." Bleeding was once a "sheet-anchor," immersing amputated limbs in boiling pitch was a "sheet-anchor." I have no doubt that a large number of the cases of gangrenous diphtheria found in that hospital are of the cases wherein there is a complication of albuminuria, and to which corrosive sublimate or some other form of mercury has been given. The medical chemists say that corrosive sublimate principally passes away from the system with the urine. Think of those great emunctories, the kidneys, being filled up and impeded in their operation by albumen, and then, of the system behind them loaded with corrosive sublimate that has been given perhaps every two hours for many days. Per force of such dreadful and unfortunate circumstances a patient must needs die. In that hospital the mortality of diphtheria is said to be about thirty per cent. I do not believe the mortality, when the cases are treated properly, should be more than ten per cent. Nay, it should be rather less.

Now, before having proceeded further in the investigation of these questions, it will be well to note the forms of death which supervene in the disease; for such note will throw light upon the value of the medicines employed. I believe that asthenia is conceded to be by far the most frequent cause of death. The asthenic condition gradually deepens; the whole muscular system fails, fails; the heart becomes weaker and weaker, flutters, and finally stops; the scaleni and intercostals, and the diaphragm, become utterly exhausted; and the laryngeal muscles themselves become wearied unto death, permitting fatal occlusion of the glottis by collapse. I say I believe that it is commonly conceded that general asthenia is the most frequent cause of death in diphtheria. Then there are the paralyzes proper that either directly or indirectly cause death. They are sudden in their appearance. The heart may be paralyzed, whereupon life will instantly cease; the muscles of the larynx may be paralyzed, whereupon the patient may die of sudden asphyxia, the immediate result of collapse of the glottis. Or, there may be paralysis of the diaphragm, or of any of the external muscles of respiration, in which case the effects of fatal asthenia are immensely hastened by a prostrating stress thrown on the other muscles of respiration, inducing gradual (asthenic) asphyxiation. Also there may be paralysis of the cesophagus, or of the laryngeal muscles, rendering deglutition difficult or altogether impossible; in which case the patient may die of inanition, or of asthenia brought on by the complication. But, in diphtheria which is not disastrously

phar-

treated, I believe that these paralyses are rare. And, beyond all peradventure, the so-called direct paralysis of the heart is, in fact, usually asthenic cardiac failure, or asthenic failure of some other organ or organs equally important. Still, in the malignant forms, paralysis may appear within the first week or ten days. Also, death by lethargy, and by coma, is especially liable to ensue when large quantities of liquor are given. In a number of cases the lethargy of the brain prevents supplementary voluntary power in breathing, and thereby assists in the induction of gradual asphyxia. In small children especially, asphyxia is often brought about by occlusion of the larynx by false membrane, and in such cases alcoholic lethargy rapidly hastens the fatal climax.

Also for the purposes of this article, it is valuable to note certain particular and formidable general phases of diphtheria. The cases with these phases may be designated as the malignant. I would characterize septic, and the so-called "gangrenous" forms, and the nasal, as malignant. I believe that there is no specific difference in the poison that produces malignant diphtheria and that which produces the milder forms. It is the particular state of the seat of the intromission of the germ that determines whether the case shall be mild or severe. All the malignant cases, the complete history of which I have been able to obtain, have given an account of a previously diseased condition of the part attacked. The worst cases are those that have been, and are, coincidentally affected by chronic catarrh of the throat and nares. And, it is here as we should expect, patches of mucous membrane are denuded of epithelium, and there is often superficial ulceration. In scorbutus a similar condition is seen. I believe that it is these raw surfaces that yawn to receive the germ. Furthermore, the hypertrophied lymphatics in the neighborhood are patent conduits, eager to take up and carry the germs and their ptomaines abroad from the gates of entrance. I believe therefore that the epithelium is the (perhaps perfect) wall against the specific germ of diphtheria. Hence, preserve the epithelium both before and after the invasion of the disease. More than all, do not destroy any of it either by means of escharotics, or by alcoholic applications, or by mechanical denudation. And do not institute an exfoliation of this protective covering by the specific and constitutional effects of mercury; do not, I pray you.

Another very important question presents itself. Why do the germs run a course in the system and disappear? They complete a cycle of life in the system and are no more. Why is this? So far as I am aware we do not know. They may possibly be destroyed by their own ptomaines. But all is conjectural. However, seemingly the germs follow the path of a cycle, and then their existence is at an end. It is the knowledge of this cycle of germ-existence that is of vast importance in the treatment of diphtheria. I shall call attention to it again.

And, to me, what seems a highly important possibility, is this: I have a very deep impression that the mild forms of diphtheria are those where there are no solutions of continuity of the epithelium. In such instances the specific micrococci do not perhaps at all gain admission into the general system; but their ptomaines may be absorbed somewhat and thereby produce mild systematic effects. I believe that such instances furnish a vast majority of all the cases put together. They will end towardly with almost no treatment at all. Be careful not to break the epithelium, and if there is a wound upon the body keep it dressed in a thoroughly aseptic manner. Prevent if possible the intromission

of germs into the system at large. I will also say that I do not believe that moderate swelling of the contiguous lymphatics and of other soft structures is much evidence that the germs have gained admission to the general circulation; for those parts may swell by turgescence, and by a stress laid on common absorption. Nearly all the cases just indicated will get well if not too much interfered with by meddling medicine. They should not be thrust into great peril by mechanical abrasions, by escharotics, or by alcoholic and mercurial destruction of the epithelium. I repeat, do not, I pray you, become the unwitting fomenters of a dreadful mortality by the employment of dangerous and deadly agencies in these mild cases, whose numbers are vast. Do not convert a great number of these simple, and comparatively innocent cases into malignant forms by virtue of your treatment; for simple and cautious antiseptis alone will cure nearly all.

Now let us revert to the alcoholic treatment of diphtheria, and to the treatment of diphtheria by the internal administration of corrosive sublimate. I do not believe that alcohol, or any alcoholic beverage, can take a curative part in the medical treatment of diphtheria. Upon the other hand, I believe alcohol to be dangerous and destructive. I believe that alcohol is one of our most powerful anæsthetics. In the lethal stage of diphtheria some of our friends give it in extravagant doses to arouse the patient from a condition of torpor. TAYLOR, in his indisputably authoritative work on "Poisons," affirms that in cases of death from the effects of alcoholic poisoning "the lungs, or brain, or both, are intensely congested," and that "the fatal termination can be almost invariably traced to that cause." Now, in the cases of diphtheria where there is a dangerous congestion of the lungs, brought on by protracted dyspnoea, our friends just pour in the alcohol. Yes, pour it in and make the fire blaze as high as possible! Fan the congestion into an inflammation! DR. RICHARDSON, (that renowned and sincere investigator) says that full and continuous doses of alcohol reduce human temperature to below the normal standard. Our friends, when a patient's heat falls to an imminently dangerous subnormal reading, just swim him in alcohol. Some zealous advocates give to an adult, so affected, a fluid ounce and more of strong whisky every two hours, so long as his life lasts. When such cases have fallen into my hands I have had the pleasure of rapidly increasing their temperature by forbidding any more alcohol to be given. As I have already said, DR. RICHARDSON's investigations prove that alcohol increases the pulsations of the heart many thousands of times in the twenty-four hours, doubtless tending to induce its gradual exhaustion thereby. The investigation also proved that alcohol brought on general muscular weakness, which was only a confirmation of what FRANKLIN had demonstrated about a hundred years before. Our friends of alcohol say, in diphtheria "support the strength," therefore give whisky *ad infinitum*. Truly, reason is of all shades and degrees.

All intelligent persons are aware that profound coma can be easily induced by alcohol. Suppose that we increase the lethargy incidental to partial asphyxiation in diphtheria by the abundant administration of alcohol. Why, we lose the supplementary volitional power of the brain over motion. The patient sleeps, and all is—not so well; we get cyanosis, then palor, then death. Or, if coma does not supervene, the additional stress of labor which the system puts upon itself to rid it of the alcoholic poison, wears it out unto death. The muscles, which else might have borne up against the depressing cycle of diphtheria successfully,

fail certainly, gradually, and fatally. The muscles of respiration yield; and the heart stops. According to my belief, that is the way that alcohol "supports the strength." Such results as alcohol accords afford the grimmest sarcasm against a false but widely spread theory.

As to alcohol in diphtheria, as well as in all other adynamic diseases, I believe it to be a delusion and a snare. I believe it to be a dangerous and useless agent when employed, as it often is, in the condition of shock incidental to grave surgical injuries. In such instances it anæsthetizes instead of revives the appalled and stunned economy. An eminent authority (KOTTMANN) has lately declared against its use in shock; so of others; others follow and the tides turn.

Now, once more as to corrosive sublimate, that most virulent of the mercurials. Some medical people give it internally for the cure of diphtheria. They give it from the incipency of the disease until its termination. They say that wherever a refractory germ persists in its course, and enters the circulation, it shall be met by a fatal dose of corrosive sublimate circulating in the blood, and already prepared for it. And each and every germ must be so met, and then their dead carcasses floated out of the system in a perfect flood of whisky. Everything is excited, and the dead germs, ptomaines and all, are carried away in a hurry, and the sinking patient is "supported" at the same time. A few days ago I saw a man going along the street in a zigzag fashion; it was cold and his gait was uncertain; so I offered him support of another kind (external), saved him from a policeman, and landed him among his friends. This man had had only a part of the treatment, the alcoholic. If I am irreverent it is because I have a safer and more rational treatment to offer; and it is one which I have proven over and over again. The corrosive sublimate people are wrong; their remedy is very dangerous, and often fatally destructive.

In diphtheria the function of the kidneys is frequently oppressed by albuminuria. Many years ago DR. CRAIGIE and SIR R. CHRISTISON (of England), made extensive observations which proved conclusively that persons affected by granular kidney, with albuminuria, are particularly liable to the dangerous and fatal impressions of mercury. Persons with such an affection of the kidneys, who take mercury, are liable to gangrene of the throat, necrosis of bones, and death; and these fearful results may follow from one to a few alterative doses, or applications, of the drug. BARTHOLOW has said that "important changes occur in the kidneys (in diphtheria), and at a very early period of the disease. They are swollen, intensely hyperæmic in the severe cases, but little so in the mildest; but, in all cases changes occur in the Malpighian tufts and in the tubules. The tufts are hæmorrhagic, contain micrococci colonies, and are surrounded by lymphoid cells; the epithelium of the tubules is cloudy, granular, and swollen, and is often detached in the form of casts with epithelium adherent." Let those who wish to reason put BARTHOLOW's statements, and those of the eminent pathologists named, and that of the aforesaid authoritative toxicologist, together. The inference will be at once impressive and conclusive.

Certain so-called septic cases are doubtless often produced by mercury, in the form of corrosive sublimate or otherwise, which agent cannot be eliminated by the already incapacitated kidneys. TAYLOR says that bichloride of mercury is mostly eliminated by the kidneys; and that when they are oppressed and unable, the poison is thrown back upon the system with the destructive results already

described. I have no doubt that under such circumstances, gangrene and putrefaction often occur independently of the specific nature of diphtheria, and that common septicæmia ensues as a matter of course; the mercury being the prime mover in the dreadful train. Nay, in these cases there is doubtless more than this: altogether there are the septic effects of mercury, the septic effects of the microbe of putrefaction, and the septic effect of the diphtheria microbe—the mercury having perhaps thrown open the door for the entrance of the two latter forms of poisoning.

As a proper interpolation, permit me to say that the older disastrous methods of treatment, in civilized places, have faded away. Blood-letting, catharsis, repeated emesis—and tartarized antimony in “broken doses,” lobelia, and such like, are matters of ancient history, to be reverted to as remarkable curiosities. But the days of those remedies had *their* “graver and more fatal epidemics.” The mystery of the gravity of such epidemics may often be solved by studying the gravity of the remedies employed! An evil and blind genius may sometimes fall upon the times.

In conclusion, permit me to present the proper and rational treatment of diphtheria, in so far as I am able to conceive it. If I have been prolix in saying what not to do, I will be brief in saying what to do.

The first thing to consider is that diphtheria is produced by a specific germ (or, as is remotely possible, by a variety of specific germs), and that the germ runs a cycle and disappears. At present, as I believe, there is no known means of preventing this occurrence. Our germicides certainly do not reach all the germs. Those that are external we are only able to decimate; those that are in the lymphatics and in the system at large we cannot attack at all. While this cycle is in progress what shall be done? Why, conserve, and add to the strength; and resort to the best and strictest antisepsis, both externally and internally. Give the patients nutritious and easily digested foods; predigested foods if possible. Malted milk is excellent for the purpose, and there are other excellent foods of the same class. In cases wherein deglutition is impossible on account of paralysis, inject absorbable foods and fluids into the rectum. I regard the injection of fluids through the œsophagus into the stomach as being very dangerous in diphtheria, on account of the great liability to spasm of the larynx. I believe that spasm of the larynx in such cases usually causes fatal prostration and sudden death; therefore, do not resort to it at all, for the paralysis of the muscles concerned in deglutition, will, in all probability, be transient; and in the meantime considerable efficient nutriment may be administered per rectum.

As to antisepsis, if the patient's strength will permit, the first thing to do is to cleanse him from head to foot with warm soap and water. Then the face, head, neck, and forearms should be washed with a suitable disinfecting solution; say a proper solution of the bichloride of mercury, or of the peroxide of hydrogen. The interior of the throat, and of the nose should be washed out not oftener than once every two hours with a solution of the peroxide of hydrogen. This destroys some of the diphtheria germs and lessens the liability to septicæmia. If the patient is very weak do not disturb him so often as every two hours, once in three will do. If the symptoms are not too urgent let the patient rest undisturbed from 12 o'clock midnight until 6 in the morning. I believe too frequent disturbance to be a great cause of death. A strong mixture of quinine

and syrup of yerba santa, or of liquorice, may be given in doses every two to four hours. Quinine is a mild germicide, and when so given disinfects gently the primæ viæ. The tincture of iron mixed with syrup, and given, acts in a similar manner, with the additional power of being a tonic for the blood. In case that apnœa threatens by reason of occlusion, or of stenosis, of the larynx, a surgeon should be called, and requested to make an opening in the trachea. However, I view this as an unfortunate contingency, for I regard tracheotomy as increasing the dangers from sepsis. I would advise the surgeon to use a cautery (if such a means is practicable), so as to sear the edges of the wound as he proceeds; for in this way the intromission of germs and ptomaines into the lymphatics and blood-vessels at the seat of the operation might be prevented, at least for a time. After tracheotomy I counsel the same mild measures that I have already indicated. As to intubation, I have had no experience in the observation of its effects; but where there is dangerously oppressive occlusion or stenosis of the larynx it might subserve a good purpose. But it is my opinion that all such cases as those which are reduced to so low an estate as to require an operation, are not liable to recover at all.

The paralyzes of diphtheria are almost invariably transient. They appear suddenly, and after a brief duration disappear as suddenly as they come. Their transient nature is a phenomenon worthy of thought and comment. According to my observation, when paralyzes occur in the acute stage of diphtheria there is a coincidental subnormal temperature. This fact points out to me that perhaps the paralysis is brought about by the slowing of the rate of nervous conduction by a lessening of the natural caloric of the body; for it is a principle well known that a depression of temperature will decrease the velocity of nervous force. It is my belief, therefore, that to sustain the heat of the body is a prophylaxis against paralysis in diphtheria. The application of external heat is perhaps the best means. When there is a subnormal temperature large and frequent doses of alcohol will still further rob the system of its heat and thereby greatly facilitate the supervention of paralysis—perhaps paralysis of the heart, which of course is instantly fatal. Upon the principle urged the application of heat will tend to shorten the duration of, and cure, the paralyzes of diphtheria.

The inhalation of oxygen, immediately before and after an operation is doubtless valuable.

Abscesses of the neck, and also of the middle ear, sometimes occur in the malignant cases of diphtheria, and they should be treated with extreme wisdom and caution. The opening of a diphtheritic abscess by surgical means is a very grave matter, and should not be lightly undertaken. It is my opinion that the abscess should always be opened by means of the actual cautery, so that no blood-vessels or lymphatics may be laid open, and that secondary infection may be avoided thereby. The cavity should be instantly washed out with a very efficient antiseptic solution; and great care should be taken not to lacerate the pyogenic membrane, and thus avoid sepsis from a source of violence.

If from any cause septicæmia supervene, I still recommend the same mild, gentle, and cautious treatment as that which I advocate in the cases of less grave import. And I here affirm solemnly that I do not believe in the alleged efficacy of alcoholic liquors in any form of septicæmia. In common surgical septicæmia I eschew them, as I certainly do in all other adynamic diseases. Most for-

tunately, however, when a kindly and cautious treatment is adopted from the beginning in diphtheria, septicæmia does not by any means so often occur.

The so-called "gangrenous" phase of diphtheria I regard as being simply an almost certainly fatal extension of an already grave septicæmia. Mild measures are unavailing, though they palliate; heroic measures but hasten the tragic end.

And now, with extreme sincerity and candor, I leave the contents of this article to the gracious consideration of those who may honestly and conscientiously differ from me on so momentous a subject; and to those whom I hope to convert to a belief in the doctrines expressed. And if I have any sympathizers who think and feel as I do myself on this intricate but humane question of science (and involving for the most part but charitable labor), to imagine their existence and presence is a most grateful thought indeed.

